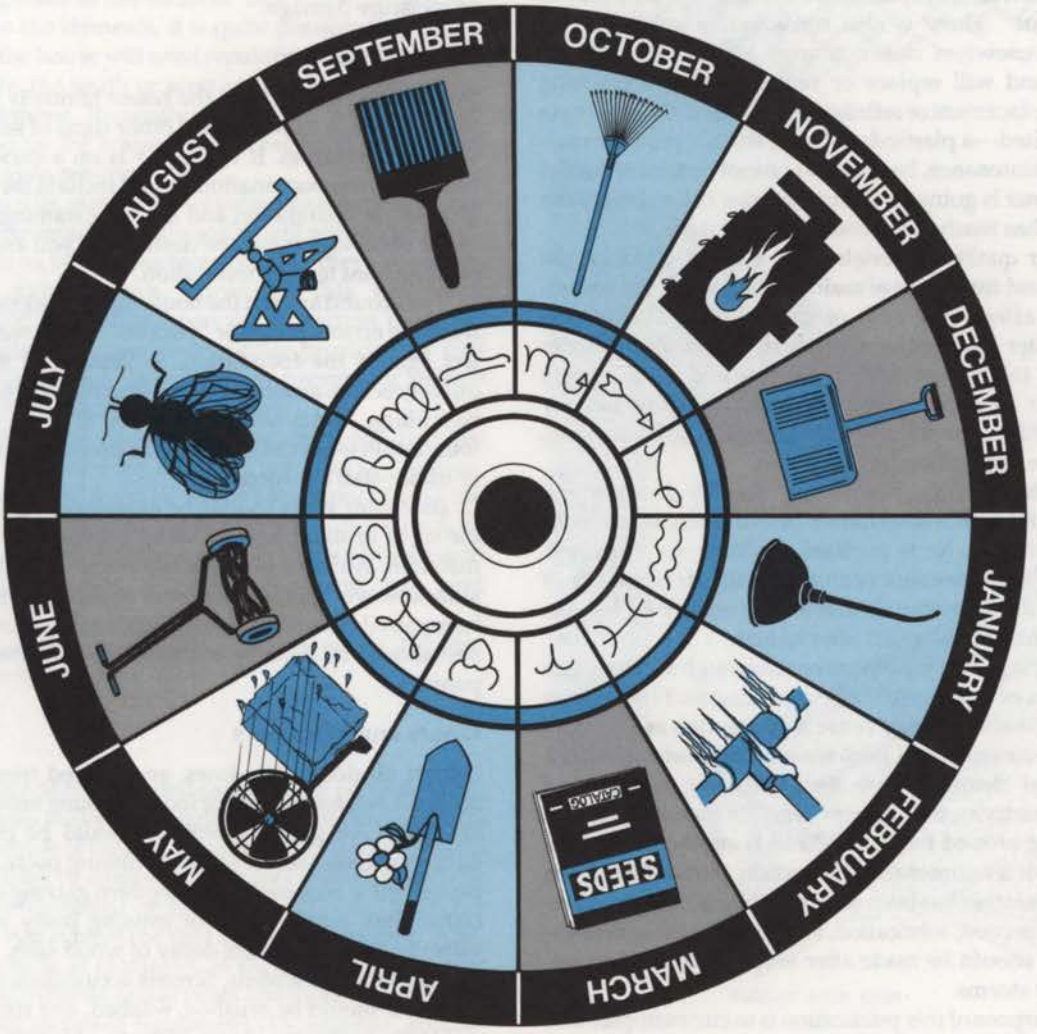
In Progress

MAINTAINING

THE HOME



Small Homes Council-Building Research Council
University of Illinois at Urbana-Champaign

The homeowner has long strived for the "maintenance-free" house. Unfortunately, even with the many material advances made during the last few years, the goal of the house that will take care of itself has not been achieved. New materials and finishes have given prolonged life to many items that make up the house, but even these will require maintenance at some point during the ownership of the house. There is also some question as to whether the homeowner really wants to have a product that will never need replacement. Obviously, appliances and mechanical systems become obsolete during the life of the house and warrant replacement even though they are not "worn out." There is also considerable evidence that many housewives desire change just for the sake of change and will replace or refinish many items long before replacement or refinishing is needed. One example may be cited—a plastic-faced wall surface requires minimum maintenance, but the cost cannot be justified if the homeowner is going to change interior colors before the material has reached the end of its useful life.

Higher quality materials have a direct effect on the amount and frequency of maintenance, which, of course, directly affects the cost of maintenance. When the homeowner is selecting a product, he should consider both the initial cost and the anticipated maintenance costs. For example, plastic-surfaced window sash or siding will cost more, but the savings in painting costs may more than offset the initial cost.

Unfortunately, the homeowner usually does nothing about maintenance until failure or malfunction occurs. In some instances, he is justified in doing so. However, preventive maintenance ordinarily will extend the life of equipment and materials and will generally be less expensive than replacement after failure.

Spring is a good time to make a thorough maintenance inspection of the house for several reasons. First, winter weather conditions may cause deterioration or failure in building materials and joint sealants. Second, spring is a traditional clean-up time and, following a period of general inactivity, the homeowner is "in the mood" to "do something around the house." Fall is another good time to schedule a maintenance inspection, particularly if the summer weather has been severe. Seasonal equipment requires inspection, lubrication, and repair. Also, special inspections should be made after severe winds, rains, ice, and snow storms.

The purpose of this publication is to cite examples and general areas where home maintenance is needed and to present an organized program for inspection.

COUNCIL NOTES **Volume 10, Number 4**

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 Published by the Small Homes Council-Building Research Council of the University of Illinois at Urbana-Champaign, One East Saint Mary's Road, Champaign, IL 61820. This publication is one of a series written for the homeowner. A complete list of publications is available upon request.

STRUCTURAL MAINTENANCE

Water is the cause of more premature failure and deterioration of building materials than any other single factor. The penetration of water (whether it be as a vapor, a liquid, or as ice) into the structure can cause paint failure, discoloration, decay, foundation failure, masonry cracking, and many other problems. Water can come from the exterior as rain or snow, from below the house as either liquid or vapor, or from within the house as vapor produced by family activities. It is most important that the house be checked thoroughly for all symptoms of moisture damage.

Foundation

Inspect the perimeter of the house annually for termite tubes, damage to wood, and other signs of subterranean termite infestation. If the house is on a crawl space or basement, the examination should include the inside surfaces of the foundation and the floor framing. More frequent observation may be desirable if you are in an area of significant termite infestation.*

The ground around the house should be graded so that there are no low places or "pockets" where water can collect against the foundation. Settlement of the soil frequently occurs around new construction due to improper backfilling. Water which is allowed to stand against the foundation walls can seep into the basement, crawl space, or under-slab air ducts.

Basement walls should be examined from the inside for signs of dampness or water stains. There are some materials available to repair basement walls from the inside; however, any serious water penetration will have to be repaired from the outside. This is a major undertaking and should be done by a qualified waterproofing company.

Doors and Windows

Inspect all doors, windows, and related trim for paint failure. Look for cracked or loose caulking around frames and trim. All glazed openings should be checked for damaged glass and for loose or missing putty. Where replacement is required, use a modern glazing compound rather than putty. Loose or missing putty will permit water to enter and cause decay of wood sash.

Inspect insect screens. Screens accumulate dirt and insects and should be brushed, washed, and rinsed.

Door locksets, door closers, hinges, window operators, and all other moving parts should be checked for adjustment and smooth operation and lubricated as required. Floor tracks of sliding doors should be cleaned and waxed.

Storm windows should be cleaned and installed in the fall. Storm windows (or insulating glass) are important since they reduce or eliminate condensation on the inside surface of glass. Condensation on windows can run down and ruin the finish on or cause decay of wood window sash and sills. Weatherstripping of doors and windows should be checked for damage and fit.

*Drywood termites are common only in Southern and Western coastal areas, and an infestation may occur in any part of the house, since the termites do not require any contact with the soil.

Exterior Walls

Since masonry is a brittle material, it is particularly susceptible to damage from the freezing of water which is able to penetrate the wall. Therefore, any cracks or loose, crumbling mortar joints should be repaired immediately.

All painted surfaces should be checked thoroughly for paint failure (peeling, crazing, cracking) and normal wear. Spot painting should be done as required. The length of time between repainting will vary considerably with the type of paint used, the method of application, and the exposure of the surfaces. Due to the variables of exposure to the elements, it is quite possible that only a portion of the house will need repainting at any one time; for example, the south or west walls in a climate where the sun is intense. Repainting before it is necessary may not be good for the house since an excessive build-up of paint can cause peeling failure.*

Window sills, especially, are subject to severe exposure from the elements. Normally, soffits will not need repainting as often as vertical surfaces because they are not exposed to rain or sun. However, this will vary considerably, depending upon the protection provided by shade trees and overhangs. Shade provided by roof overhang is an important factor in preventing surface deterioration caused by sun and rain.

While checking for paint failure, all wood surfaces should be inspected for damage (cracking or splitting, decay). Damaged material should be replaced and the condition which caused the failure corrected. Check all trim and siding for tightness of fit. Nails can be loosened by normal expansion and contraction, and may need resetting.

* One paint authority suggests that a build-up greater than .030" will probably cause peeling failure.

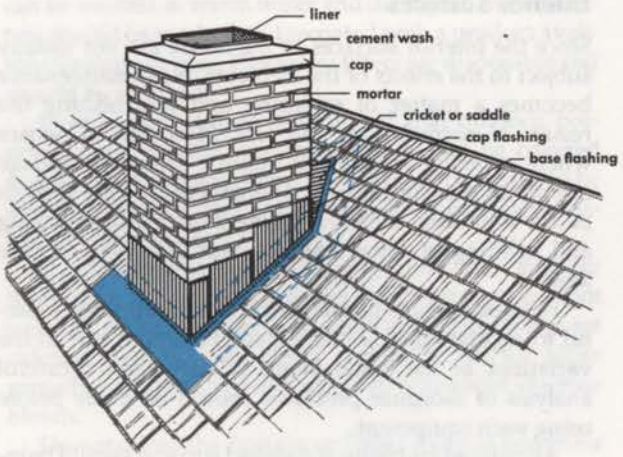
Roof

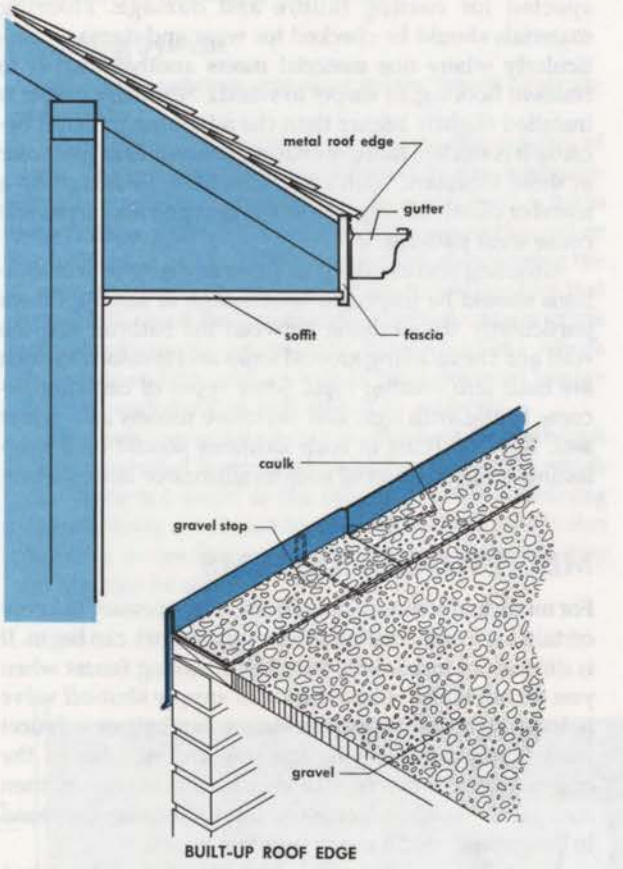
The roof should be inspected carefully for possible leaks. Usually, leaks are very difficult to locate. If there is access to the underside of the roof, trouble spots may be revealed by water stains or dampness. The roof surface should be checked for damaged or loose shingles. Tree branches which can rub against the roof should be trimmed. Also, inspect flashing at chimneys, at the juncture of the roof and vertical surfaces, and at vents and flues. The supports for any roof mounted equipment (TV antenna, air conditioner) should be checked for damage to the roof surface.

While on the roof, antenna guy wires should be tested for tightness, flues and vents cleaned of bird nests and other obstructions, and the area inspected for other maintenance problems that may occur. The condition of masonry chimneys is of particular concern, including mortar joints, caps, and washes.

Blocked gutters and downspouts are a major cause of paint failure and decay of the fascia and soffit. When gutters or downspouts become clogged, overflowing water will find its way to joints in fascias and soffits. Accumulations of leaves will wick water out of the gutter onto the roof, roof sheathing, and fascia. Therefore, gutters, gutter strainers, and downspouts should be periodically cleaned of leaves and debris. Gutters receive severe exposure and are likely to require annual painting or spot painting. New galvanized surfaces present problems in obtaining paint adhesion. Extensive surface preparation and a special primer paint are required. Factory primed or painted gutters are recommended if a painted surface is to be used.

On flat roofs, the joints between lengths of the metal gravel stop at the roof edge pull loose due to expansion and contraction of the metal. These joints will have to be resealed periodically.





BUILT-UP ROOF EDGE

Interior Surfaces

Since the interior surfaces of the house are not usually subject to the effects of the elements, most maintenance becomes a matter of repairing and refurbishing the results of normal wear and tear. However, in houses where excessive moisture is present, extensive damage can occur. Also, in climates where there are long periods of low humidity, excessive dryness can cause shrinking and splitting of some material, and loosening of glue joints.

In some cases, a humidifier or a dehumidifier is useful to regulate the moisture level. However, due to the variations in the living habits of each family, careful analysis of moisture problems should be made before using such equipment.

All painted and natural-finished surfaces should be inspected for coating failure and damage. Flooring materials should be checked for wear and damage, particularly where one material meets another (carpet to resilient flooring, or carpet to wood). Normally, carpet is installed slightly higher than the adjoining material because it is thicker, thereby causing premature carpet wear at these locations. Such areas should be protected by a metal or plastic edging. Doors dragging on the carpet will cause wear patterns.

Grouting and caulking in joints in damp or wet locations should be inspected for damage or failure. Check particularly the caulking between the bathtub and the wall and the caulking around sinks and lavatories which are built into counter tops. Some types of caulking become brittle with age, and therefore useless as a water seal. New caulking in such locations should be a long-lasting resilient material such as silicone or latex sealant.

MECHANICAL SYSTEMS

For many maintenance operations, it is necessary to know certain basic information before repair work can begin. It is difficult or impossible to repair a leaking faucet when you do not know where the water supply shut-off valve is located, or to try to purchase a fan belt or a faucet washer without knowing the size and number of the original item. If this type of information is known, then such minor repairs become routine. Otherwise, they tend to be ignored until a major problem occurs.

The following items should be located and marked where necessary. It is equally important that all adult occupants be familiar with the location of these items:

- Electrical Main Switch, if there is one.
- Electrical Distribution Panel should contain itemized list of all lighting, receptacles, and equipment connected to each circuit.
- Electrical switches for equipment located away from main electrical panel, *i.e.* air conditioning condensing units (outside).
- Water supply valve for entire system.
- Water supply valves for each plumbing fixture. (A valve enables the homeowner to make repairs on individual fixtures without turning off the water supply for the entire house.)
- Cleanout plugs in sanitary waste lines. A cleanout is usually located at the end of each major branch line. In some communities, a cleanout is located in the main building drain just beyond the edge of the house.
- Septic tank, distribution box, and leaching field, if there is no sanitary sewer system.
- Gas supply valve for entire system.
- Gas valve and pilot light on each gas appliance.

A file should be maintained for warranties, guarantees, instructions, and parts lists on all installed or portable equipment. Experience will indicate which items require more frequent maintenance, and it will be possible to have a supply of replacement parts on hand, such as washers for faucets, fuses, and a fan belt for a forced air heating and cooling system.

The mechanical systems within the house should be given careful attention. Much of the repair and maintenance on the mechanical systems can be done by the homeowner if he has the "know-how." However, even for the capable and experienced homeowner, there is some work which should be done only by a qualified serviceperson. In some communities, it may be illegal for the homeowner to do some work, such as electrical rewiring or certain plumbing repairs.

Electrical System

The condition of lamp cords, extension cords, and plugs should be inspected periodically and replaced at the first sign of wear or damage. Exposed wiring (*i.e.* in garage, unfinished basement, etc.) should also be checked and replaced at the first sign of wear or damage. Switches and receptacles should be replaced immediately upon malfunction or damage.

If fuses blow or circuit breakers trip frequently, an electrician should be contacted to determine the cause and make necessary repairs. If a slight tingling shock is experienced when handling or touching any appliance, the appliance should be disconnected and repaired before using it again.

While repairs to cords and sockets are within the ability of most home handymen, electrical repairs involving changing circuits, adding outlets or making connections within the service should be done only by an experienced electrician.

Heating and Cooling System

It is desirable to have the heating system checked in the fall and the cooling system checked in the spring by a qualified serviceperson. Checking of compressors, pumps, motors, and adjusting of pilot lights, bonnet thermostats and other devices within the system should be done only by a serviceperson.

In a forced-air heating and/or cooling system, the blower and motor must be protected from dirt and dust. For this reason, there are filters located in the return-air side of the blower unit. The filters must be changed or cleaned at least twice a year and perhaps as frequently as once a month, depending on the amount of usage and the amount of dirt and dust in the air. Clogged filters will not allow a sufficient amount of air to pass across the heat ex-

changer or the cooling coil, thereby causing inefficiency of operation and inadequate heating or cooling. The homeowner should check filters monthly to determine their condition. The Record of Maintenance (see page 6) will then establish an anticipated frequency for change.

Clean the furnace room, supply and return grilles, and ducts with a vacuum cleaner insofar as possible.

The blower bearings, blower motor, or hot water circulating pump motor should be oiled unless they are sealed. Manufacturer's recommendations should be checked for amount and frequency of oiling. (Unless specified otherwise, bearings on electric motors should receive 2 or 3 drops of oil once or twice per year.) Check fan belts and pulleys for wear and proper tension. The air conditioning condensing unit (usually located outside the house) should also be cleaned. The grille and coils will collect insects, dirt, and trash, and should be brushed and hosed as needed.

The evaporator coil (usually located within the house in the heating and cooling unit) functions as dehumidifier as well as a cooling element. Therefore, it condenses water which collects in a pan beneath the coil and is conducted to a drain. This drain line can easily become blocked and may require periodic cleaning to remove dust and algae. Overflowing water during cooling is a symptom of this condition.

If air conditioners are installed in windows, they should be removed and stored for the winter season because 1) they leak cold air both around and through the unit, thereby creating drafts and discomfort; 2) window and sill decay can occur unnoticed around the unit if it is left in place permanently; and 3) maintenance of unit is more convenient. The air conditioning unit should be cleaned thoroughly, motor and blower lubricated as required, and checked for rusting of metal parts (spot paint as required). Window air conditioners also have filters which should be checked frequently. Plastic foam filters can be washed in warm water and detergent. Metallic filters should be washed and recoated with a product available for that purpose. Fiberglass filters are disposable and should be replaced.

Most manufacturers recommend that outdoor portions of air conditioning units should not be covered during the off season, since the units are designed to be weather-resistant, and a watertight cover can trap moisture within the unit.

If humidifier or dehumidifier is used, clean and dry thoroughly, oil as required, and check for rusting. Spot paint all rusted areas as required. Check humidifiers for calcium deposits and check dehumidifiers for algae growth. Algae can be removed with household chlorine bleach.

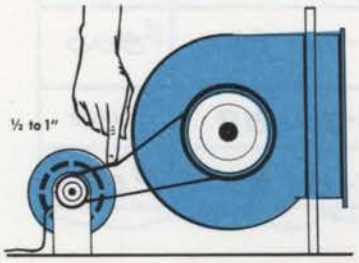
Do not allow the furnace or boiler room to become a storeroom for flammable materials.

Plumbing System

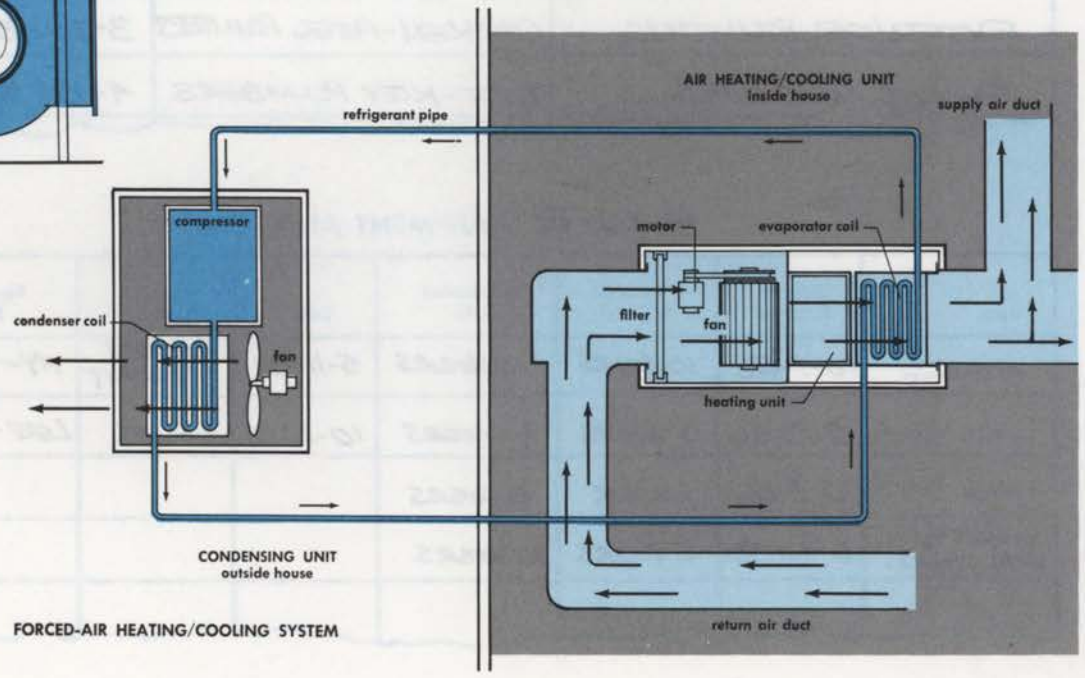
All faucets, hose bibbs, and other valves should be checked for leaks.

Water closet flushing systems are frequent wasters of water. The top of the flush tank should be removed periodically to check its operation. If the water level is up to the overflow, either the float has become waterlogged or the ballcock is leaking. This can be checked by raising the float arm to see if the water flow can be stopped by that method. To check the tank ball, add a small amount of ink or food coloring to the contents of the flush tank. Check an hour or so later, and if water in the toilet bowl has become colored, the tank ball should be replaced.

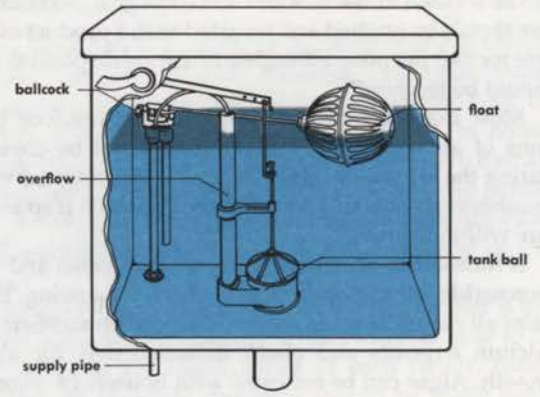
Moisture condensation on the outside of the flush tank is best controlled by installation of a mixing valve which adds some hot water to the filler line. A kit containing foamed plastic insulation for the inside of the tank is also available, as are factory-insulated tanks. A special drip pan can also be used.



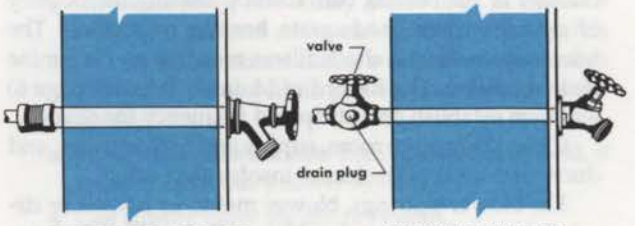
CHECK BELT TENSION



FORCED-AIR HEATING/COOLING SYSTEM



FLUSH TANK



FREEZEPROOF HOSE BIBB STANDARD HOSE BIBB

The pressure relief valve located near the top of the water heater should be opened periodically to see that it is in operating condition. Also, approximately 3 gallons of water should be drained from the water heater every 3 or 4 months to remove any sediment that may have accumulated in the bottom of the tank. If either of these valves have not been opened in some length of time, they may not seal properly when closed and a new washer may be required.

If municipal or private sanitary sewers are not available, the sewage disposal system of the house will probably include a septic tank. The frequency of cleaning required by the septic tank depends on the size of the tank, the flow of sewage to it, and the method and conditions of disposal of the tank overflow. As long as the active working space between the scum and sludge is adequate to decompose sewage by bacterial action, the tank does not have to be cleaned. It is an erroneous idea that a tank needs to be pumped when it is filled—the tank is always full.

The tank should be inspected every year or two. When the space between the scum and the sludge becomes one-half the total depth of the tank, pumping is advisable. A two-chamber tank of adequate size should not need pumping more frequently than once in seven to ten years. If inspection shows raw sewage at the outlet, the tank should be cleaned. If the tank is allowed to fill to the point that sludge is discharged into the disposal field, the disposal field may become plugged and have to be replaced.

A record of inspection and maintenance should be kept. It is also a good idea to plot the location of the septic tank and its inspection tiles, and the disposal lines, with measurements from fixed points.

RECORD OF HOUSE MAINTENANCE

Description of Work	Repairs By	Date	Cost
TERMITE PROTECTION	FLY-BY-NITE EXT. CO.	2-16-89	$800
EXTERIOR PAINTING	CHEKEN-PEEL PAINTERS	3-20-89	$1500
FAUCET WASHERS	LEE-KEY PLUMBERS	4-8-90	$50

RECORD OF EQUIPMENT AND REPAIRS

Item	Date of Purchase	Period of Warranty	Anticipated Life	Date	Item	Repairs By	Cost
Water Heater	10-1-85	10 YEARS	10 YEARS	5-11-89	HEATER ELEMENT	HY-VOLT	$50
Clothes Washer	8-23-86	5 YEARS	10 YEARS	10-26-89	VALVE	LEE-KEY	NO CHARGE
Range	10-1-86	1 YEAR	8 YEARS				
WINDOW AIR COND.	6-10-90	5 YEARS	10 YEARS				

Grounds and Yard

Depending on the severity of the winter, outside hosebibbs (if they are not freezeproof) and water lines should be drained each fall. Water should also be drained from garden hoses and they should be cleaned and stored in a protected location. Storage of a reel provides protection from damage. Some plastic hoses become brittle in cold weather, and cannot be used during the winter.

Areaways, window wells, storm drains, and their outlets should be cleaned and damaged items repaired. During the fall, particularly, areaways and window wells should be checked frequently since drains in these areaways can be clogged by only a few leaves. Windblown leaves will collect quite rapidly in such locations. All gasoline-powered equipment which will be out of service for a season should have the fuel drained or stabilized and be serviced in accordance with the manufacturer's directions. In the fall, all snow handling or snow melting equipment should be checked and readied for service. Snow removal is made easier by coating the snow shovel with wax or silicone.

The winter is a good time to clean and repair all garden tools and equipment. All dirt and rust should be removed and surfaces coated with oil, silicone, or wax. Splintered or rough wood surfaces, such as handles, should be sanded and refinished.

Spray guns can become clogged and useless due to the chemical residue from pesticides and weed killer. Fertilizer left in a spreader can be extremely corrosive. All such equipment should be thoroughly cleaned after each use. Leftover chemicals should be checked for expiration date and those which are to be saved should be stored in a cool, dry, locked cabinet. Flammable chemicals and paints shold be stored in a special metal cabinet.

All paved surfaces (concrete, asphalt, etc.) should be checked for cracks, settlement, and soil erosion adjacent to these surfaces. Asphalt surfaces are quite susceptible to deterioration from water if adequate drainage from these surfaces is not provided. Also, asphalt is subject to deterioration from petroleum products, such as gasoline and oil drippings. If you are contracting for this sealing operation, be sure to choose a reputable contractor. Cracks in concrete surfaces should be thoroughly cleaned and repaired with patching compounds which will bond to existing concrete.

All wood structures such as fences, gates, etc. should be inspected for termite attack and decay. When replacement becomes necessary, use a more durable species of wood (redwood, cypress, or black locust). Wood which is to be imbedded in the ground or in concrete should be pressure-treated.

PERMANENT RECORD OF MAINTENANCE

A record of all maintenance to the house and its equipment is of value for four reasons. Such a record indicates 1) the date on which each job was done, 2) frequency of work to be done, 3) the cost of each job, thereby allowing the homeowner to budget for future maintenance, and 4) who did the maintenance, which provides the homeowner with a list of servicemen to call (or not to call) in the future.

Also, if the job was done by the homeowner, it is important to indicate what materials were used and where they were purchased.

When moving into a new house, it is a good idea to obtain from the builder extra floor tile, ceiling tile, wall covering, and similar materials for repairs. This is particularly important for materials in which changes occur frequently, such as floor coverings.

MAINTENANCE CHECK LIST

The frequency of inspection and service given in the chart is minimum. Items may need to be checked more often or at other times due to number of occupants, types of materials, local conditions, household pets, etc.

1. FOUNDATIONS AND BASEMENT

	Spring	Fall	Annually	As Required
a. Inspect for signs of termite infestation.			*	
b. check grading to assure that water will drain away from the foundation.			*	
c. check basement for dampness and/or leakage following wet weather.			*	

2. DOORS AND WINDOWS

	Spring	Fall	Annually	As Required
a. check doors, windows, and trim for finish failure.	*			
b. check glazed openings for loose putty.	*			
c. check for broken glass and damaged screens.	*			
d. clean screens.	*			
e. check and lubricate window hardware.	*	*		
f. check weatherstripping for damage and tightness of fit.	*			
g. check caulking at doors, windows, and all other openings and joints between dissimilar materials (*i.e.* wood-masonry.	*			

3. EXTERIOR WALLS

	Spring	Fall	Annually	As Required
a. check masonry for cracks and loose joints.	*			
b. check painted surfaces for paint failure.	*			
c. check siding and trim for damage or decay.	*			
d. check all trim for tightness of fit.	*	*		

4. ROOF

	Spring	Fall	Annually	As Required
a. check for damaged or loose shingles, blistered roofing, etc.	*			
b. check underside of roof where accessible for water stains or dampness.	*			
c. check for damaged flashing.	*			
d. check for damaged gutters, downspouts, hangers, and strainers.	*			
e. clean gutters and downspouts.	*	*		
f. evaluate gutters, downspouts, and sheet metal for repainting.			*	
g. evaluate roof for future replacement.			*	
h. check vents, louvers, and chimney caps and housings for bird nests, etc.	*	*		
i. check fascias and soffits for paint failure and decay.	*			
j. check antenna guy wires and supports.			*	
k. check masonry chimneys.	*			

5. INTERIOR SURFACES

	Spring	Fall	Annually	As Required
a. check all finished surfaces for dirt, finish failure, and required repairs.	*			
b. check all joints in ceramic tile, laminated plastic, and similar surfaces.	*	*		
c. check grouting around tubs, showers, and sinks.	*	*		

6. FLOORS

	Spring	Fall	Annually	As Required
a. check for wear and damage, particularly where one material meets another.			*	
b. evaluate for replacement or refinishing.			*	

7. ELECTRICAL SYSTEM

	Spring	Fall	Annually	As Required
a. check condition of lamp cords, extension cords, and plugs—replace at first sign of wear or damage.	*	*		
b. check areas where wiring is exposed. Replace at first sign of damage.	*	*		
c. if fuses blow or breakers trip frequently, call an electrician to locate the cause and make repairs.				*
d. if you feel a slight shock or tingling from touching any appliance, disconnect it and make repairs.				*

8. HEATING AND COOLING SYSTEM

	Spring	Fall	Annually	As Required
a. clean or change any air filters.				*
b. clean dirt and dust from around furnaces, condensing unit, grilles, and registers.	*	*		
c. have heating and cooling system checked by a qualified serviceperson.	*	*		
d. remove window air conditioners for winter.		*		
e. service humidifier and/or dehumidifier.			*	

9. PLUMBING SYSTEM

	Spring	Fall	Annually	As Required
a. check faucets, hose bibbs, and flush valves for leakage.				*
b. check septic tank.			*	
c. check water heater.			*	

10. GROUNDS AND YARD

	Spring	Fall	Annually	As Required
a. drain outside water lines and hoses.		*		
b. clean areawells, window wells, and storm drains.	*	*		*
c. check driveways and sidewalks for cracks, yard for soil erosion.	*			